APPENDIX R. USER INSTRUCTIONS FOR NATIONAL ENERGY SAVINGS (NES) AND NET PRESENT VALUE (NPV) SPREADSHEET

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R.1 USER INSTRUCTIONS

The results obtained in this analysis can be examined and reproduced using the Microsoft Excel® spreadsheet available on the U.S. Department of Energy Building Technologies website at: http://www.eere.energy.gov/buildings/appliance_standards/commercial/ac_hp.html.

The spreadsheet is called "NES_CUAC.xls" and it enables the user to perform NES analyses of commercial unitary air conditioners either for the ≥65,000 Btu/h to <135,000 Btu/h equipment class or the ≥135,000 Btu/h to <240,000 Btu/h equipment class. To execute the spreadsheet requires Microsoft Excel® 2000 or a later version.

The NES spreadsheet performs calculations to forecast the change in national energy use and net present value due to an energy efficiency standard. The energy use and associated costs for a given standard are determined first by calculating the shipments and then calculating the energy use and costs for all commercial unitary air conditioning equipment shipped under that standard. The differences between the standards and base cases can then be compared and the overall energy savings and present values determined. The NES spreadsheet or workbook consists of the following worksheets:

Summary of Results The summary of results contains user input selections and a Summary table, Shipments graph, Cumulative Energy Savings and NPV graph, and Annual Non-Discounted Savings Trend plot.

Shipments Summary Contains a tabular summary of the annual shipments forecasts for each standards case.

65-135 Savings An accounting worksheet used to tally the energy and cost savings year by year for the ≥65,000 Btu/h to <135,000 Btu/h equipment class. The energy and cost savings in a single year are the difference between the base case energy use and costs for that year and the standard case energy use and costs in the same year.

65-135 Stock A worksheet that keeps track of all commercial unitary air conditioner stock in the ≥65,000 Btu/h to <135,000 Btu/h equipment. Stock is updated for each year.

65-135 Projections A worksheet that contains historical and projected equipment prices, operating expenses, and energy use for the ≥65,000 Btu/h to <135,000

Btu/h unitary air conditioning equipment class. These values are used as inputs to the shipment model.

135-240 Savings An accounting worksheet used to tally the energy and cost savings year by year for the ≥135,000 Btu/h to <240,000 Btu/h equipment class. The energy and cost savings in a single year are the difference between the base case energy use and costs for that year and the standard case energy use and costs in the same year.

135-240 Stock A worksheet that keeps track of all commercial unitary air conditioner stock in the ≥135,000 Btu/h to <240,000 Btu/h equipment. Stock is updated for each year.

135-240 Projections A worksheet that contains historical and projected equipment prices, operating expenses, and energy use for the ≥135,000 Btu/h to <240,000 Btu/h unitary air conditioning equipment class. These values are used as inputs to the shipment model.

Economic Trends A worksheet that contains historical and projected economic values as well as historic shipments data.

EER Trends A worksheet that contains projected EER trends values for each combination of efficiency scenario and growth trend.

Equipment Parameters A worksheet that contains the survival function for commercial unitary air conditioners and other equipment parameters used to project prices and calibrate the model.

Savings Summary A bookkeeping table used to store the results of the shipments and energy savings calculations.

Basic instructions for operating the NES spreadsheet are as follows:

1. Once the NES spreadsheet file has been downloaded from the Web, open the file using Excel. At the bottom, click on the tab for the worksheet Summary of Results.

2. Use Excel's View/Zoom commands at the top menu bar to change the size of the display to make it fit your monitor.

3. The user can change the model parameters listed in the gray box labeled "User defined inputs". The parameters are:

a. Equipment Class: To change the value, select cell E6 . A drop-down arrow pops up. Select the desired Equipment Class (≥65,000 Btu/h to <135,000 Btu/h or ≥135,000 Btu/h to <240,000 Btu/h).

b. Max Tech: To change the value, select cell E8 . A drop-down arrow pops up. Select the desired type of maximum technologically feasible efficiency level (12 EER or 2+ EER).

c. Economic Growth: To the change value, select cell E10. A drop-down arrow pops up. Select the desired Growth level (Reference, Low, or High).

d. Discount Rate: To the change value, select cell E14. Type in the desired Discount Rate.

4. Once the user parameters have been reset the model must be re- run. To re-run the model press the "UPDATE VALUES" button. Note: No values are updated until the "UPDATE VALUES" button is pressed.

   Tabular results are presented to the right of the "User defined inputs" box for the base case and the ASHRAE 90.1, 10.0, 10.5, 11.0, 11.5, and 12.0 EER standards cases. Tabular results are summarized as: 1) shipments, 2) percentage change in shipments, 3) national equipment cost change in billions of dollars, 4) national operating cost savings in billions of dollars, 5) national net present value in billions of dollars, and 6) cumulative national energy savings in quadrillion Btus. With the exception of the ASHRAE 90.1 standards case, results for all standards cases are tabulated for the period from 2008 to 2035. For the ASHRAE 90.1 standards case results are tabulated for the period from 2004 to 2035.

   Graphical results are presented for each the tabular results. Two charts are provided for the given model parameters: 1) shipments forecasts for the base case and all standards cases and 2) national energy savings and net present values for all the standards cases.

5. For a given set of user defined parameters, the user can also view the annual trend in the non-discounted net impacts for an individual standard level. To view an efficiency level select cell N20, and then select an EER level from the drop-down list.